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CHAPTER 31

The researcher and the territory: accompanying complexity

Hermine Papazian, Jérôme Queste, Pierre Bommel and François Bousquet

'The territory imposes itself as framework for coordination between multiple and fragmented actors in situations of asymmetry and with divergent interests' (Caron, Chapter 1). The challenge is that to achieve any useful coordination the uses and dynamics of natural and renewable resources have to be taken into account. This imperative leads many scientists to define their object of study in terms of a social and ecological system. Several different approaches exist for studying such an object, irrespective of whether it is a territory or a social and ecological system. For the past several decades, the complexity sciences, concerned with the states that emerge from interactions between heterogeneous entities, have provided a framework and tools to do so.

Complexity research undertaken between the 1950s and the 1980s showed the unpredictability of the future state of a system composed of interacting heterogeneous entities (Langton, 1992; Weisbuch, 1991). However, just because a system's future state cannot be calculated, it does not mean that the system will be in a state of disorder. Such a system will transition from a more or less stable organized state to another more or less stable organized state. The research therefore consists of understanding the phases of transition between these states. In the world of applied research on the relationships between nature and societies, various approaches have been gradually developed on the basis of these theoretical advances. An example is adaptive co-management (Armitage *et al.*, 2007), which proposes that the different stakeholders should together observe the trajectory of the system of which they are a part, identify when the transitions take place and decide what transitions are necessary when the system is in an undesirable state.

Initiated by CIRAD in the 1990s and applied since then by numerous teams on a wide variety of objects, the accompaniment approach proposes a process, a posture and tools to monitor the trajectory of a complex system (Barreteau *et al.*, 1997; Bousquet *et al.*, 1996; Collectif ComMod, 2005, 2006; Étienne, 2010). Apart from

a few cases of accompanying homogeneous groups[1], the general issue concerns the apprehension of the multiplicity and heterogeneity of groups of actors, and the interweaving of roles, mandates, responsibilities and rights in relationship with various interacting resources. By considering the territory as a complex system to which the accompaniment approach can be applied, we introduce some recent useful reflections. They pertain to the methodology, then to the posture of the accompanier, and, finally, to the effect of the process on the accompanier himself – three research issues that we suggest are relevant for general research on the territory.

A METHODOLOGICAL PROPOSAL TO ACCOMPANY THE REGIONAL CO-MANAGEMENT OF A TERRITORY

The co-management of a territory requires the reconciliation of a horizontal cross-sectoral dialogue with a vertical participatory approach. The horizontal dialogue confronts the institutions, practices and interets whose proponents are the spokespersons of the various economic sectors. The vertical participatory approach confronts the points of views of the practitioners with those of the technicians and experts responsible for defining the 'good' practices and those of the policymakers in charge of forging formal institutions (Berkes, 2009). We use the Girovar case study to present the methodology to do so.

On Réunion island, the Integrated Organic Waste Management through Agricultural Enrichment on Réunion project (French acronym: Girovar, Chapter 21) was aimed at addressing an environmental issue: the management of organic waste in one of Réunion's four metropolises, a peri-urban territory of more than 180,000 inhabitants. The problem involved the divergences between the perceptions and expectations of the economic sectors, environmental ones (waste collection and treatment), agriculture, livestock husbandry and the agrifood industry.

The methodological choice was to compare intersectoral points of view, but to do so by involving different types of spokespersons within each sector (Queste, 2016). The participatory mechanism implemented was divided into three multi-actor arenas: practitioners in participatory workshops, technicians in technical group meetings, and institutional entities in steering committee meetings. Each arena was organized taking into account the constraints, habits and rituals of these three groups of actors: a multi-purpose hall in a rural area and an informal atmosphere for practitioners, a meeting room with IT facilities for technicians, a prestigious conference venue and the reading of speeches prepared in advance for the institutional entities.

Each of these three arenas was invited to work in sequence on a common prospective scenario, each one starting from the conclusions of the previous one. The common scenario then played the role of a frontier object (Carlile, 2002), i.e., allowing the translation, the transition from one arena to the other. The participation of facilitators in all the arenas also contributed to the convergence of proposals from the three arenas towards

1. There exists a frequent confusion between 'local scale' and 'homogeneity of the community'. Thus, it can happen that very diverse actors interact on multiple resources in a very small space, in the same way that very homogeneous groups can interact on a single resource over a very large space.

a common proposal that was, at the same time, institutionally legitimate, technically credible and relevant to the practitioners (Cash *et al.*, 2003). The scenarios produced in this way of co-management of organic matter have enabled this peri-urban territory to be accompanied in the process of resolving a green-waste crisis and to engage in territorialized recycling sectors for these materials, forming relationships between waste producers, processors and organic-fertilizer consumers (Wassenaar *et al.*, 2016).

Ethical choices in accompanying territorial transformations

We present a case study on an Amazonian territory, which serves as a basis for a reflection on the ethics of accompanying territories.

In the Amazonian floodplains (*varzeas*), inhabitants who traditionally used to make a living from agriculture and fishing have always coped with natural variations, between floods and dry seasons. However, climate change is now disrupting the frequencies and magnitudes of these floods, leading to great uncertainty for these populations, who realize how vulnerable they have become.

The ClimFabiam project (Bommel *et al.*, 2016) was initially designed to investigate how populations were experiencing current changes, how they were adapting their production systems, and what influence they could have on aquatic biodiversity. This project focused on the flooding of the Lago Grande de Curuaí, a territory of 30,000 inhabitants spread over 133 communities, which is part of Santarem prefecture (Pará State, Brazil). Hydrologically and biogeochemically, this territory is a good representation of the flood plains of the lower Amazon River where populations are isolated from the large cities of Pará and there is limited access to public services.

In this region, Incra, the National Institute of Settlement and Land Reform, is responsible for differentiating public lands from private ones, but due to lack of resources and the complexity of the task, land has been allocated without real demarcation and without public/private differentiation. Even though local people only have usage rights and hold no land titles, the sale of land is commonplace. Due to this legal grey area and after a long mobilization of the inhabitants, Incra finally created the 'Lago Grande do Curuaí' Agro-Extractivist Settlement Project (Portuguese abbreviation: PAE) in 2005. It is managed by the Federação Agroextrativista da Gleba Do Lago Grande (Feagle), a civil organization that institutionally represents this territory's communities. Feagle is in charge of monitoring agrarian reforms and the links between institutions, communities and social organizations. It also regulates natural resources by granting deforestation permits and hunting and fishing licenses. Today, this land registration project, designed to resolve conflicts over land and land uses, is only partially successful, as irregularities continue to be reported within the area. Moreover, its future remains uncertain. Indeed, regional conflicts and pressures from mining and timber extraction companies, as well as the complex land situation threaten its renewal and continued existence.

Given the vulnerability expressed by the actors, we first studied their concerns and strategies and then collectively discussed possible scenarios. To facilitate these debates

and make them more meaningful, a role-playing game and then a hybrid agent-based model (ABM) (allowing users to interact with the simulation) were designed progressively with producers and Feagle members.

The participatory approach forced us to revise the project's initial objectives in order to better respond to local concerns. Indeed, what emerged from lessons learned collectively from games and hybrid simulations was that the difficulties are not only due to climate change. Other changes, socio-economic and demographic, also play a part. For example, in these remote territories, population growth, due in part to the abandonment of *varzea* areas, has a significant impact on the environment. Without a sewage treatment system, this population growth is having an impact on water quality and leading to the proliferation of aquatic microorganisms. The project's biologists have shown an increased presence of cyanobacteria that pose a threat to human and animal health, as well as adverse effects on fish stocks already under pressure from commercial fishing and non-compliance with community fishing rules. Participants have often expressed the general feeling of not being heard on these issues by local authorities and institutions.

The question arises as to whether actors from outside the territory whose actions contribute significantly to the degradation of resources should be included. They include commercial fishing enterprises from Juruti or Óbidos, the *fazendeiros* (large-scale livestock breeders) of Óbidos, as well as major soya bean producers from Mato Grosso and bauxite mining companies who lobby local leaders to be allowed to buy land in the PAE. The issue of the participation of extra-territorial actors is not only methodological in nature, but also ethical. After all, we cannot blame these external actors for environmental degradation and not give them an opportunity to defend themselves through discussion and debate.

In the Amazonian context, far from the administrative centres of power, social violence is part of everyday life and extreme pressure is often exerted on the weak. Thus, by inviting external actors to participatory workshops and debates (assuming they were even willing to engage in this form of dialogue), we risked inciting more violence. In this particular context, the choice was made to initially bring together only the local actors in order to understand ongoing processes and to undertake a prospective approach. Accompanying the actors in establishing community rules aimed at guaranteeing their living conditions is already an ambitious task. By helping them to look forward over the medium term, the approach helps them to step back and understand the effects of each person's actions on the territory. Aware of the continuing deterioration, several actors have, for example, themselves proposed the strengthening of fishing rules and restrictions, or the adoption of collective forest management. In addition, by providing local institutions with scientific documentation on the state of natural resources and by contributing to social cohesion, the approach seeks to bolster the capacities of negotiation of these most vulnerable actors (Bommel *et al.*, 2016).

The accompanier too changes

After a methodological exposition, followed by an explication of the ethical posture of the researcher, we now address the reflexive dimension of the accompaniment approach. In its essence, the notion of accompaniment assumes that the various

participants will follow a trajectory that will transform them. The transformation of the scientist who accompanies territorial development is discussed here thanks to a doctoral research carried out in Senegal on the complex understanding of a pluralism of land regulation (Papazian, 2015).

A companion modelling methodology (Collectif ComMod, 2005), incorporating several methodological tools (individual interviews, role playing games, and multi-agent simulations) in a complementary way, was implemented to understand the expression of a regulatory pluralism at the scale of a Sahelian territory. The discovery and interactive use of these tools gradually changed the vision that the accompanier had of regulatory pluralism. This vision started by relying on a fixed explicative representation, result-oriented, based on surveys of the actors' land-related practices through questionnaires and interviews on Senegalese soil. It progressively evolved into a dynamic, process-oriented, comprehensive representation resulting from the complementary use of a role-playing game and multi-agent role simulations to help explain the dynamics of expression of a regulatory pluralism at the level of a Sahelian territory (see Box 31.1).

By meeting the Senegalese territory's actors through companion modelling, the representation of the pluralism of land regulation in this thesis work has been thus transformed. It has evolved from a superimposition of different land regulation systems, overlaid one on top of another, into a set of uncertain and flexible practices of actors, working interactively and dynamically in time and space. Such constructions allow the emergence of a pluralism of regulation at a territorial scale. Through the various experiments, of which one example is presented here, we observe that the accompaniment of a territory's actors contributes to a transformation of the vision of the scientist concerned. Beyond the fact that the scientist's point of view is seen only as one amongst others, his notion of the real, his own relationship with the other and with the world is called into question and transformed, during and at the end of the process of interaction with the diversity of the actors involved.

The posture adopted to accompany the actors of a territory

Territorial development is understood as the 'capacity of a territory's actors to control its future evolution' (Deffontaines *et al.*, 2001). The accompaniment approach was conceptualized, equipped and made operational many years ago so that researchers could engage with the actors for analyzing the complexity, exploring scenarios and seeking desirable futures. This involvement raises many questions and we have chosen to illustrate three of them in the light of three recent studies that deal with the methodology, ethical posture, and reflexive analysis of the scientist's transformations, without which the very notion of accompaniment would lose its meaning.

On the methodological level, these experiments show how multiple arenas and situations of action intervene during the process of accompaniment and contribute to territorial dynamics. In the experimental set-ups implemented, the co-constructed models have provided boundary objects, sufficiently flexible and polymorphic, to be

Box 31.1. Concept of regulatory pluralism.

The initial vision of regulatory pluralism analyzed in Papazian's (2015) doctoral research was derived from the concept introduced by the scientific world (Le Roy, 1996) to make sense of the jumble of the various Sahelian land regulation systems studied. This concept of pluralism is defined scientifically as a set of rules resulting from the juxtaposition of two modes of land regulation:
– local land systems, composed of sets of rights (*Ibid.*) that are complex, oral, collective and flexible in time and space, not officially recognized since independence in the 1960s by the governments of many Sahelian countries (Colin *et al.*, 2010);
– the land laws adopted by these same governments based on the generalization of individual and private ownership of rural land (Barrières, 2008), through a process of land registration.

This vision has gradually evolved during the course of the accompaniment approach towards a regulatory pluralism resulting from a dynamic and unpredictable process of interactions between individual perceptions that the different actors concerned with the land could have of their territory. If the human being is created with his temporality, he is also created with his spatiality, his personal vision of the space that he appropriates and on which he undertakes practices dynamically with emotions and feelings of ownership and identity (Barrières, 2008). For Sahelian users, the various land regulations that they perceive individually in the territory are, above all, responses to a need for land tenure security apprehended as a dynamic and changing feeling (Le Roy, 2011) according to the land context concerned. In this sense, the Senegalese users seem to have added the land policies successively put in place by Senegalese governments to their already existing – and not officially recognized – local regulatory systems. Regulatory pluralism is thus the product of a complex situation: actors secure their access to and use of land by mobilizing in a different way (Cleaver, 2002), depending on the local situation and the concerned land use, both the 'bank' of their local regulations as well as the different regulatory systems originating from land policies (both current legislation and officially obsolete legislation). They thus refer in their practices to different regulatory systems depending on the given situation.

apprehended by actors with different points of view of the territory under consideration but sufficiently robust to ensure this coherence. These models, however, have not been used autonomously, but as tools carried by the accompaniers, facilitating their role as transmitters of knowledge.

Faced with ethical questions about the commitment and social and political responsibility of the scientists involved in this type of approach, we call for a non-neutral posture on the part of researchers that promotes equity and sustainability, because we consider unavoidable the power games that take place within a territory (d'Aquino, 2002), and we consciously choose to contribute to building up the capacities of the most vulnerable actors. If we ignore asymmetries of power, we risk reinforcing these inequalities by allowing the more powerful to influence the outcomes of the participatory process more in their favour (Barnaud and Van Paassen, 2013). In stark contrast

to a neutral scientific posture, our vision of accompaniment aims to protect the most vulnerable, who also tend to be those most affected by any changes. This choice is also justified by the fact that territorial development requires the strengthening of capacities of collective action. Anything less would lead to irreversible situations, going against the very notion of sustainable and fair development.

Accompanying reflections and actions on the interactions between people, societies and resources, from a perspective of sustainable development, through the prism of a complex understanding, requires understanding no doubt, but also self-understanding and understanding of the other (Morin, 2004). For an accompanier, understanding complexity begins by becoming aware of one's own frames of reference and the paradigm from which one thinks and acts. Only then will the accompanier be able to understand the modes of reflection of others and build, over time, an exchange that transforms all the actors involved in this accompaniment.

The companion modelling approach was created to treat the management of renewable natural resources as the management of a complex system. This form of collective action, driven by its methodological and ethical choices, culminates in a set of transformations – including that of the scientist himself – that contributes to territorial development.

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